

A remarkable new species of *Zacatrophon* Hertlein & Strong, 1951
(Gastropoda: Muricidae: Ocenebrinae)
from the Gulf of California

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ABSTRACT. *Zacatrophon skoglundae* n.sp. is described from the Gulf of California and compared with *Zacatrophon beebei* (Hertlein & Strong, 1948), *Austrotrophon cerrosensis* (Dall, 1891) and *A. catalinensis* (Oldroyd, 1927). The radula characters are illustrated for *Forreria* Jousseume, 1880, *Zacatrophon* Hertlein & Strong, 1951 and *Austrotrophon* Dall, 1902. The three genera are included in Ocenebrinae Cossmann, 1903.

RESUME. *Zacatrophon skoglundae* n.sp. est décrit du Golfe de Californie et est comparé à *Zacatrophon beebei* (Hertlein & Strong, 1948), *Austrotrophon cerrosensis* (Dall, 1891) et *A. catalinensis* (Oldroyd, 1927). Les caractéristiques de la radula sont illustrées pour *Forreria* Jousseume, 1880, *Zacatrophon* Hertlein & Strong, 1951 et *Austrotrophon* Dall, 1902. Les trois genres sont inclus dans les Ocenebrinae Cossmann, 1903.

INTRODUCTION

The new species described herein was previously published as *Forreria* (*Zacatrophon*) *beebei* (Hertlein & Strong, 1948) by Myers & Hertz (1990). After a careful study of many specimens and comparison with the type species of *Zacatrophon*, it turned out to be a new species.

Repository

ANSP: Academy of Natural Sciences of Philadelphia, U.S.A.
CAS: California Academy of Sciences, San Francisco, U.S.A.
IRSNB: Institut royal des Sciences naturelles de Belgique, Bruxelles, Belgium.
MNHN: Muséum national d'Histoire naturelle, Paris, France.
SBMNH: Santa Barbara Museum of Natural History, California, U.S.A.
USNM: National Museum of Natural History, Washington, D.C., U.S.A.
CS: coll. Carol Skoglund
DP: coll. Don Pisor
RH: coll. Roland Houart

Other abbreviations

IP :	Infrasutural primary cord (primary cord on subsutural ramp)
P1 :	Shoulder cord
P2-P3 :	Primary cords of the convex part of the teleoconch whorl

SYSTEMATICS

Family **MURICIDAE** Rafinesque, 1815
Subfamily **OCENEBRINAE** Cossmann, 1903
Genus ***Zacatrophon*** Hertlein & Strong, 1951
Type species by original designation: *Trophon* (*Zacatrophon*) *beebei* Hertlein & Strong, 1948, Recent, Gulf of California..

Zacatrophon skoglundae n. sp.
Figs 1-6

Material examined. The holotype and 12 paratypes from the Skoglund Collection were examined and distributed to the following museums and private collections:
Holotype SBMNH 423912.
Paratypes: 1 ANSP 423438; 1 CAS CASIZ 182027; 1 IRSNB IG 31.468/MT2241; 1 MNHN 22716; SBMNH 423913; 1 USNM 1133478; 2 RH (no registration number) (all from the type locality); 4 CS (no registration number), from three miles SE of Punta San Antonio, Sonora, Mexico. Dredged, 60 to 90 m, by Paul & Carol Skoglund Nov. 1982

Type locality. Gulf of California, Baja California Sur, Mexico, brought in San Juanico by shrimpers.

Other material examined. *Zacatrophon skoglundae* n.sp.: Gulf of California, Baja California Sur, Mexico, San Juanico taken by shrimpers (4 specimens, 54 to 70.5 mm in length, CS); Near Loreto, Baja California Sur, Mexico (1 specimen, 64 mm in length, CS).
Zacatrophon beebei: Gulf of California (1); Cabo San Lucas, Gulf of California (1); Cerralbo Island, West

Mexico (24°18'51"N; 109°55'30"W) (2) (all coll. RH); Cabo San Lucas, Gulf of California, dredged 46 m (5) (coll. CS) (Figs 7-13).

Austrotrophon cerrosensis: Gulf of California (1) (coll. RH); Off Cedros Island, Baja California (3) (coll. CS) (Figs 14-16).

Austrotrophon catalinensis: San Pedro, California (1) (coll. RH); Catalina Island, California (1); Baja California, 27°28.3' N, 114°57.0'W, 110 m (1); Off San Diego, California, 77 m (1) (all coll. DP) (Figs 17-18).

Austrotrophon sp. Off NW Isla Smith, Bahía de Los Angeles, Baja California, Mexico, dredged 183 m (CS) [as *Trophon* (*Austrotrophon*) cf. *cerrosensis* in Skoglund (1988: 115, Fig. 10)] (Figs 19-20).

Description. Shell large for the genus, up to 72 mm in length at maturity, length/width ratio 1.7-2.2:1. Slender, elongate, narrow, lightly built. Subsutural ramp broad, tabulate, weakly convex.

Creamy-white, light tan or tan. Flat lamellae of last teleoconch whorl usually weakly darker colored. Lighter coloured spiral band at adapical extremity of siphonal canal. Aperture glossy white.

Spire high, up to 5 or 5.5 narrow, strongly shouldered, spinose, loosely coiled whorls. Suture deeply excavated, strongly impressed. Protoconch unknown, broken in all examined specimens. Axial sculpture of teleoconch whorls consisting of low, broad, flattened lamellae, more strongly developed at shoulder, producing short or long, broad, flat, guttered, spinelike projections. First teleoconch whorl eroded in all examined specimens; second whorl with 10 or 11 ribs with small, broad, shoulder spinelets; third whorl with 9 or 10 flat, almost undistinguishable ribs with flat, open spinelets at shoulder; fourth whorl with 8-10 flat lamellae, producing short or long, flat spinelets at shoulder; last whorl with 7-10 low, flat, axial lamellae, generally ending as long, upward curved, flat, guttered, open, spinelike projections at shoulder. Spiral sculpture consisting of P1, and when present, of very low, almost undistinguishable P2 and P3 on second and third whorl. Other whorls smooth or with very low, broad, concentrated, spiral cords, extending also on siphonal canal. Subsutural ramp smooth, except axial lamellae.

Aperture large, broad, rounded, with adapical portion starting at base of preceding whorl. Columellar lip broad, entirely smooth, rim completely adherent. Outer lip smooth, with smooth surface within. Siphonal canal long, broad, straight or weakly dorsally curved, broadly open, with low axial lamellae over whole length.

Operculum and radula unknown.

Remarks. Compared to *Zacatrophon beebei* (Figs 7-13, 21-23), the only other representative of the genus, *Z. skoglundae* n.sp. has broader, fewer, and more strongly developed, flat, shoulder spines (8-10 vs 10-15 in *Z. beebei*), less convex teleoconch whorls, especially remarkable at the last whorl, and more strongly developed axial lamellae. The new species apparently also reach a larger size.

Zacatrophon skoglundae n. sp. differs from *Austrotrophon cerrosensis* (Figs 14-16, 24-26) and *A. catalinensis* (Figs 17-18, 27-29, two species assigned to *Austrotrophon* Dall, 1902, a related genus, in having the typical loosely coiled teleoconch whorls with deeply impressed suture, and a tabulate subsutural ramp, typical features of *Zacatrophon*. Moreover, it also differs from *A. cerrosensis* in the absence of obvious spiral sculpture, in the more numerous axial lamellae (8-10 vs 6-8) and in the strongly upward curved and flatter shoulder spines. From *A. catalinensis* it also differs in the more numerous and less developed axial lamellae, more strongly upward curved, less developed spines, and comparatively smaller size.

Etymology. I am very pleased to name that species for Carol Skoglund who kindly put many of her specimens at my disposal for study.

Discussion. *Zacatrophon*, *Austrotrophon*, *Forreria* and the species related to these taxa were the subject of several different assignments:

- Hinds (1844: 127) described *Murex belcheri*. It was assigned to *Forreria* by Jousseaume (1880: 335).
- Dall (1891: 181) described *Trophon cerrosensis* and assigned it later to *Austrotrophon* as *Trophon* (*Austrotrophon*) *cerrosensis* (Dall, 1902: 549).

Figures 1-16

1-6. *Zacatrophon skoglundae* n.sp.

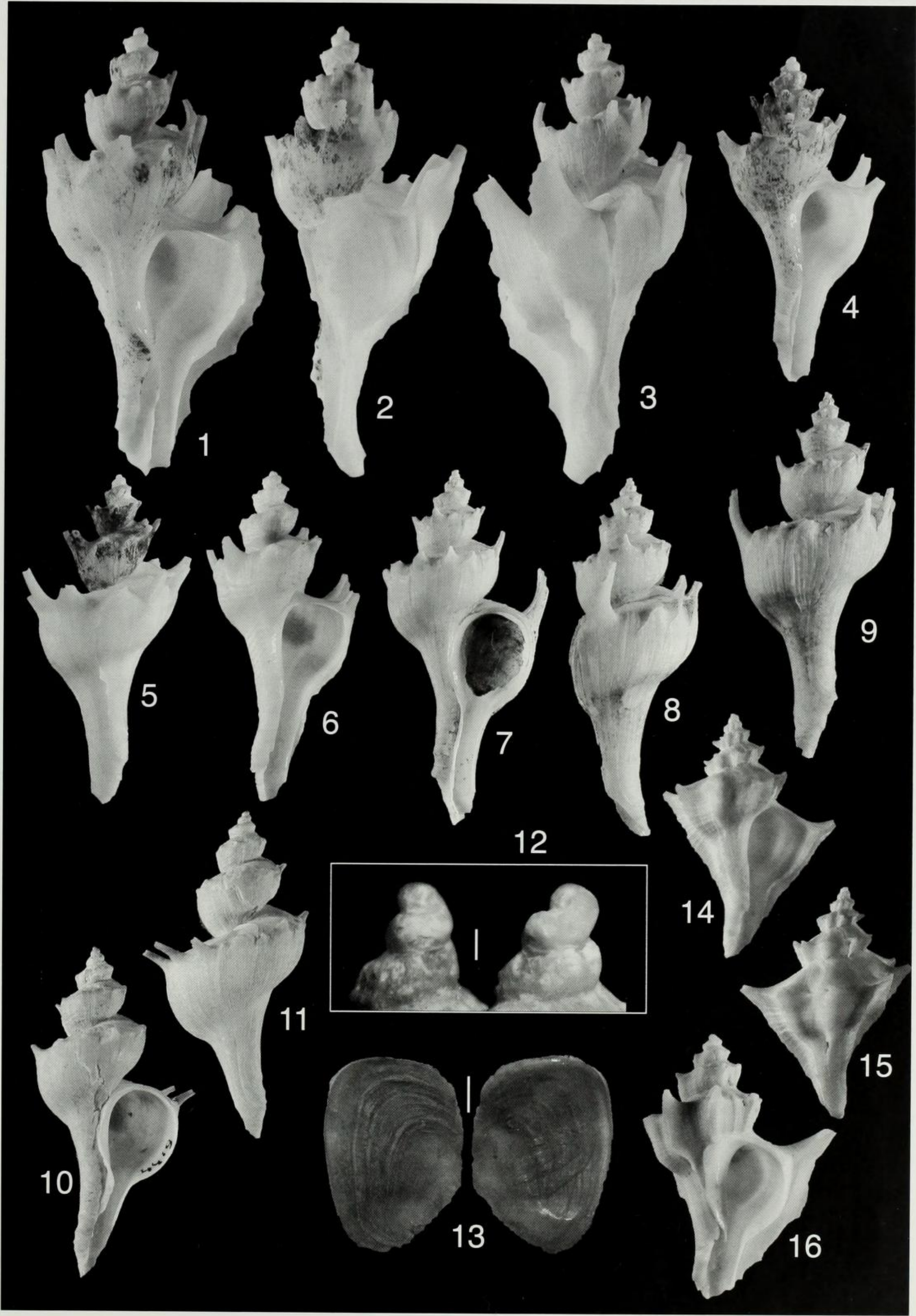
1-3. Gulf of California, Baja California Sur, Mexico, brought in San Juanico by shrimpers Holotype SBMNH 423912, 72 mm; 4-5. paratype, same locality, MNHN 22716, 41.8 mm; 6. paratype, same locality, USNM 1133478, 41.6 mm

7-13. *Zacatrophon beebei* (Hertlein & Strong, 1948)

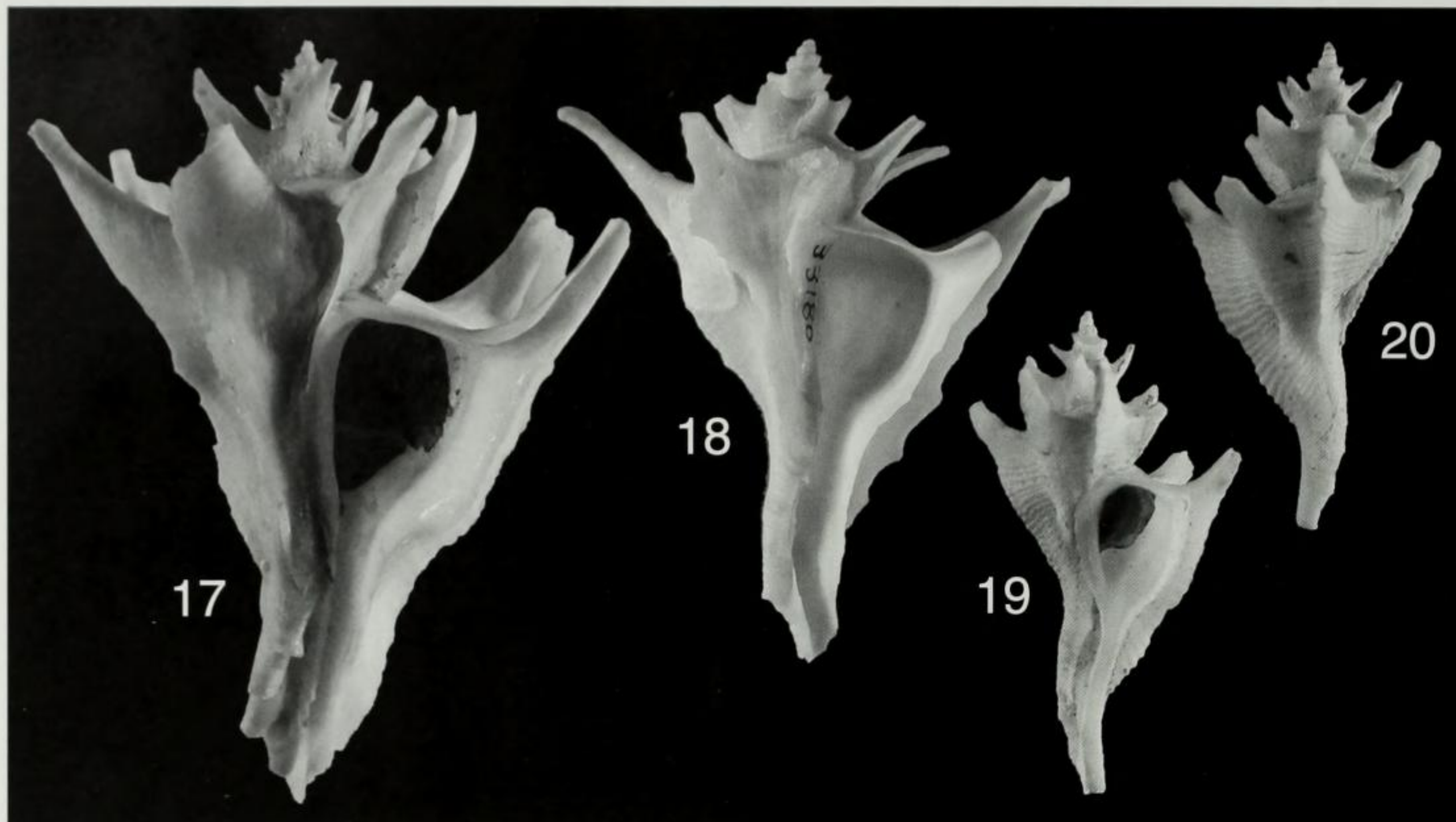
7-9. Cabo San Lucas, Gulf of California, dredged 46 m, (CS), 47.5 mm; 10-11. Cerralbo Island, West Mexico (24°18'51"N; 109°55'30"W), (RH), 40.9 mm; 12. Protoconch (CS), scale bar 0.5 mm; 13. Operculum (CS), scale bar 2 mm.

14-16. *Austrotrophon cerrosensis* (Dall, 1891)

14-15. Off Cedros Island, Baja California, (CS), 35 mm; 16. Gulf of California, (RH), 52.2 mm.



- Oldroyd (1927: 29) described *Trophon* (*Austrotrophon*) *catalinensis* from San Pedro, California.
- Hertlein & Strong (1948: 79) described *Trophon* *beebei*. Three years later they proposed *Zacatrophon* as subgenus of *Trophon* Montfort, 1810 for *Trophon* (*Zacatrophon*) *beebei* (Hertlein & Strong, 1951: 86).
- Keen (1971: 537) included *Zacatrophon* and *Austrotrophon* in Trophoninae as subgenera of *Trophon*. The genus *Forreria* was not discussed.



Figures 17-20

17-18. *Austrotrophon catalinensis* (Oldroyd, 1927)

17. San Pedro, California, (RH), 80.2 mm; **18.** Catalina Island, California, (DP), 56.9 mm.

19-20. *Austrotrophon* sp. Off NW Isla Smith, Bahía de Los Angeles, Baja California, Mexico, 183 m, (CS), 36.9 mm.

- Abbott (1974) included *Forreria* in Rapaninae (1974: 171) and *Zacatrophon* and *Austrotrophon* in Trophoninae, as subgenera of *Trophon* (1974: 191).
- Radwin & D'Attilio (1976: 176) listed all these taxa in Thaididae.
- Vaught (1989: 45) listed these taxa in Rapaninae.
- Myers & Hertz (1990) illustrated radula and operculum characters of *Zacatrophon* and included the three taxa in Thaidinae. They also considered *Zacatrophon* and *Austrotrophon* as subgenera of *Forreria* notwithstanding the strong labral tooth in the

latter, absent in *Zacatrophon* and *Austrotrophon*.

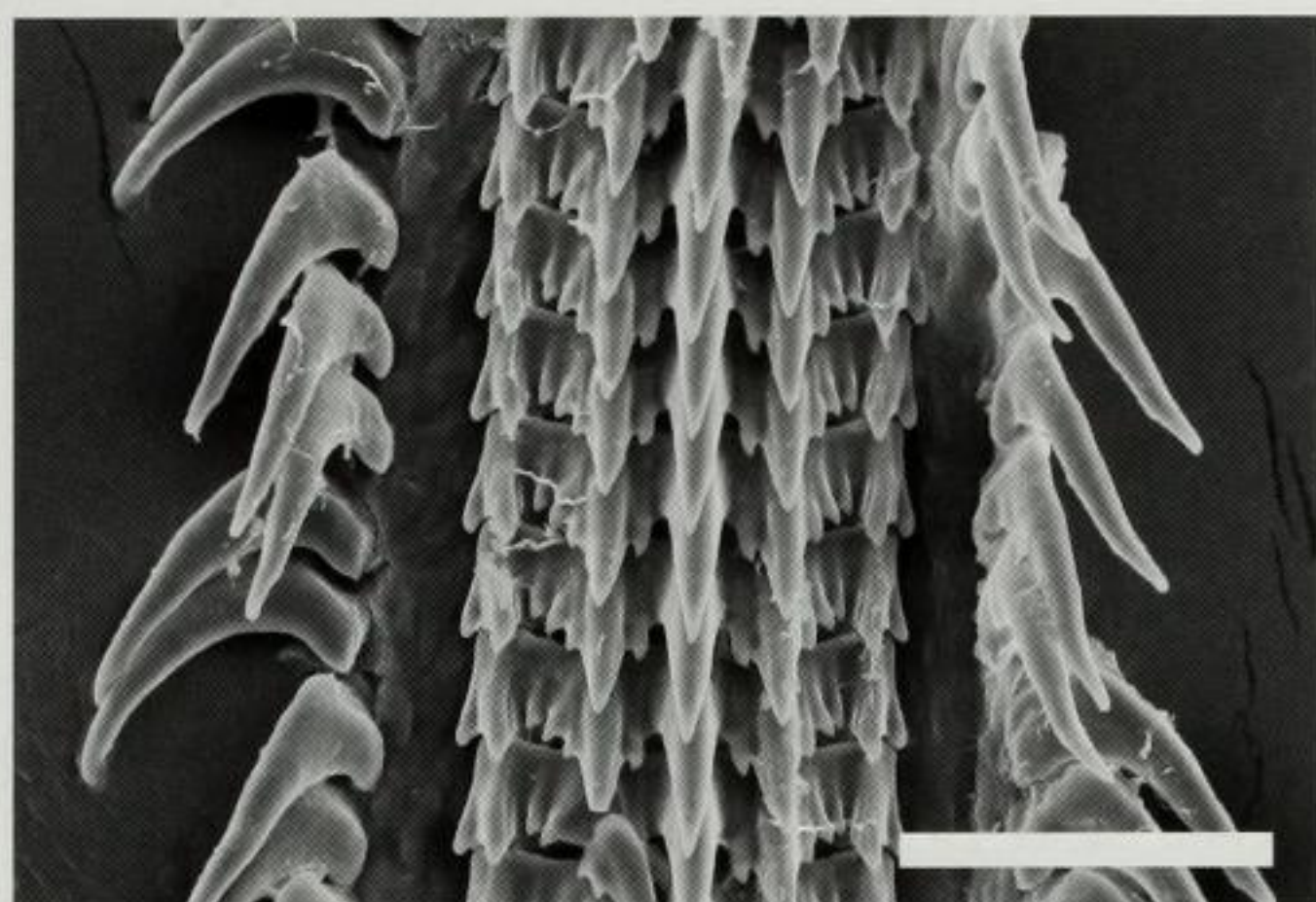
- Kool (1993) illustrated shell, operculum and radula characters of *Forreria* (1993: 164, fig. 1D; 228, fig. 26) and noted that phylogenetic analysis revealed close relationship among Ocenebrinae Cossmann, 1903 and *Forreria*, and excluded it from Rapaninae.
- McLean (1996: 82) followed Kool (1993) and placed *Austrotrophon* in Ocenebrinae.
- Vokes (1996: 6) Also included *Austrotrophon* and *Zacatrophon* in Ocenebrinae but retained both as subgenera of *Forreria*.

Figures 21-28. SEM of radulae

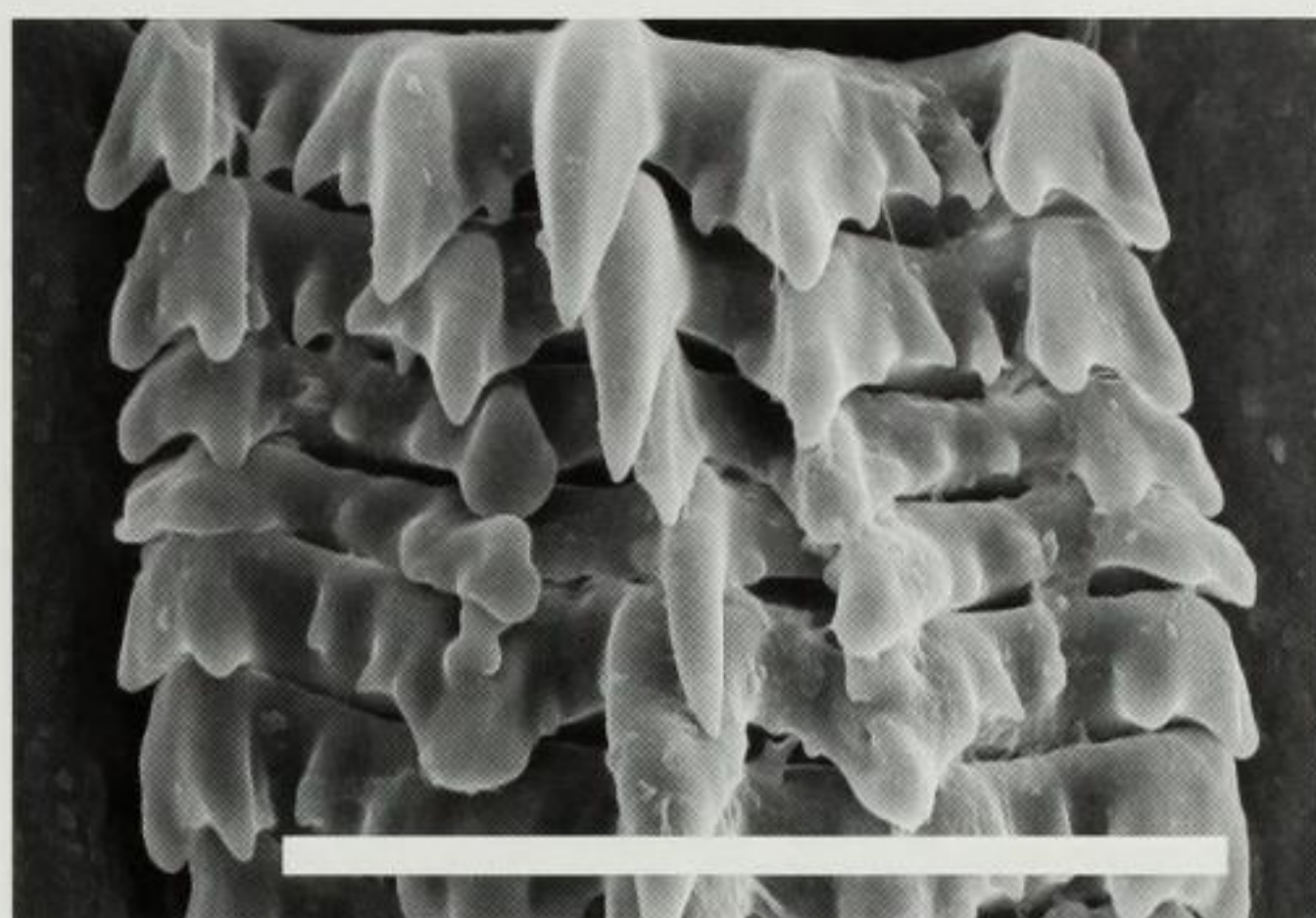
21-23. *Zacatrophon beebei* (Hertlein & Strong, 1948), Mexico, Sonora, Guaymas, 27°52'12" N, 110°50'60" W, SBMNH 93431 (scale bars: 100 µm).

24-26. *Austrotrophon cerrosensis* (Dall, 1891), Mexico Baja California, Bahia Sebastian Vizcaino; dredged Latitude: 28°26'30" N, 114°35'60" W, SBMNH 93378 (scale bars: 24-25: 100 µm; 26: 200 µm).

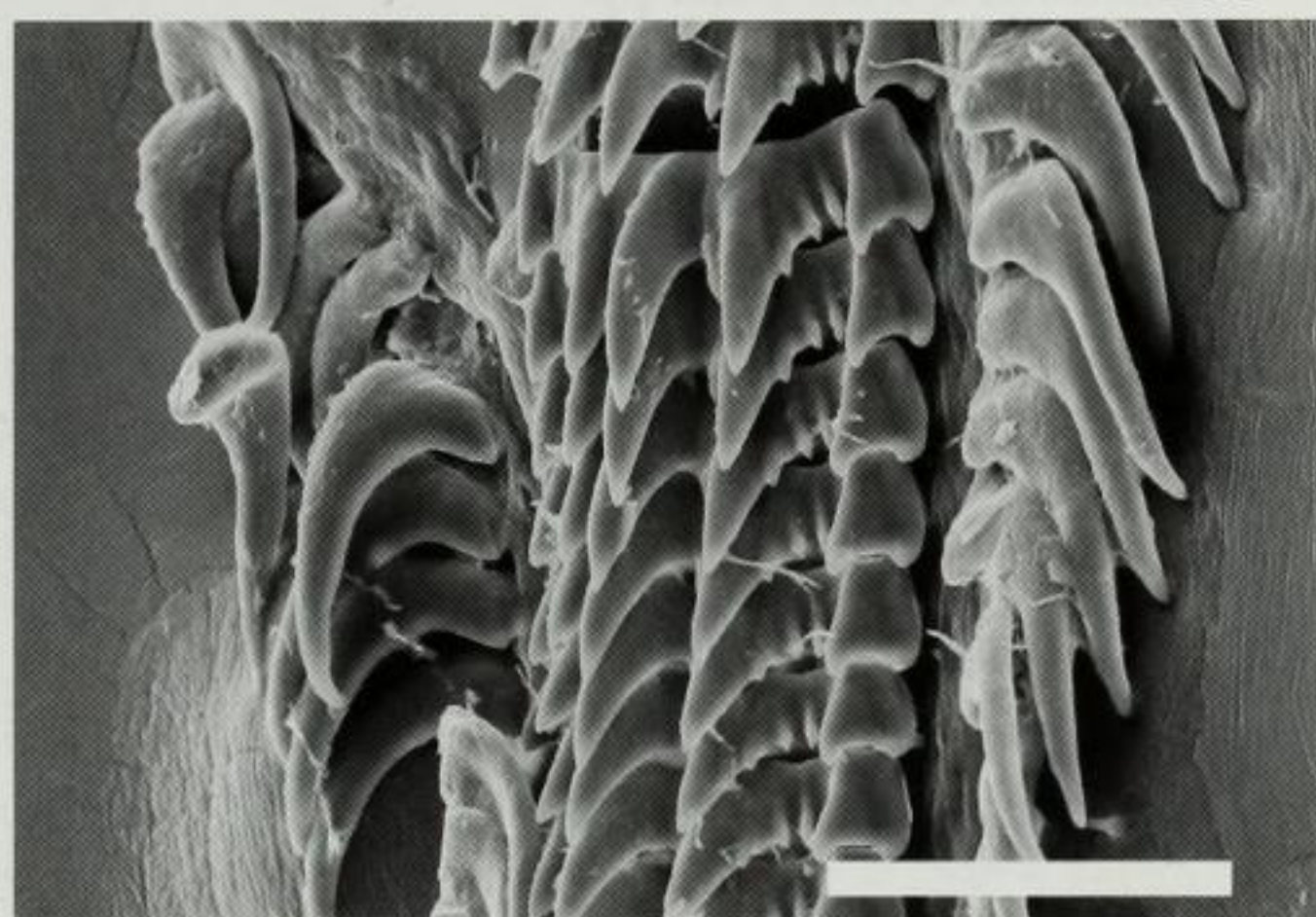
27-28. *A. catalinensis* (Oldroyd, 1927), California, Los Angeles County, San Pedro Bay, 33°40'40" N, 118°17'32" W, SBMNH 100258 (scale bars: 27: 100 µm; 28: 200 µm).



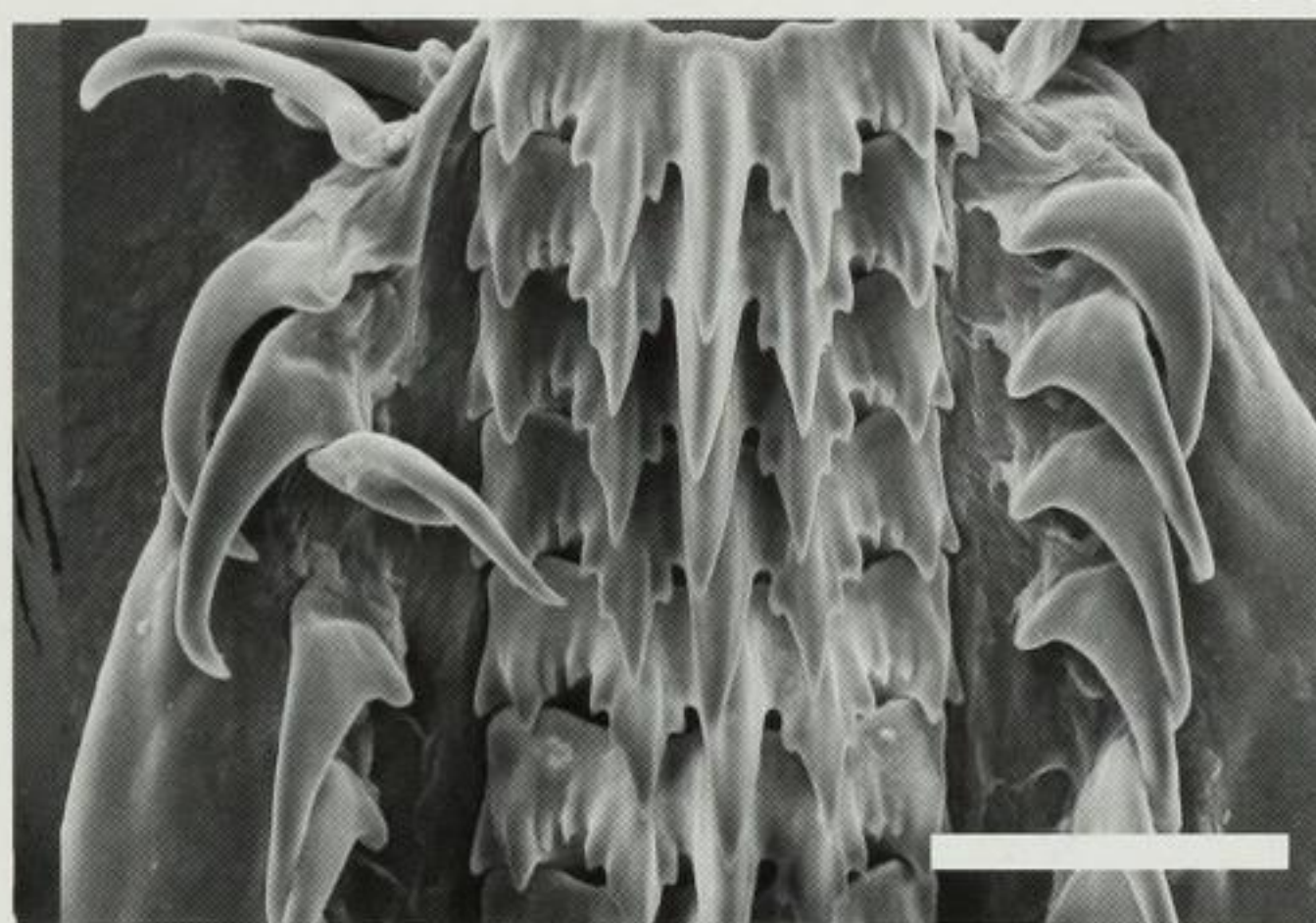
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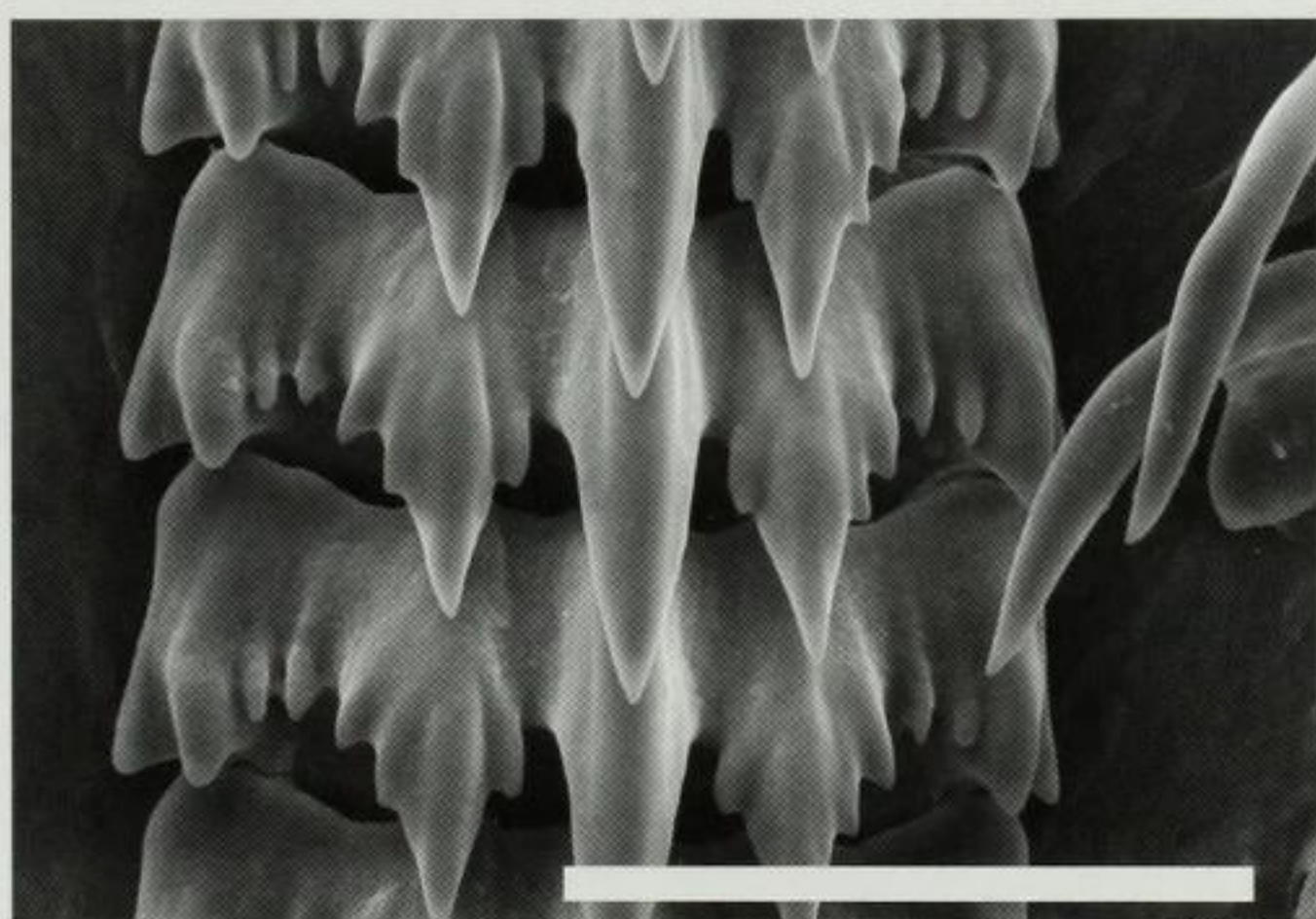
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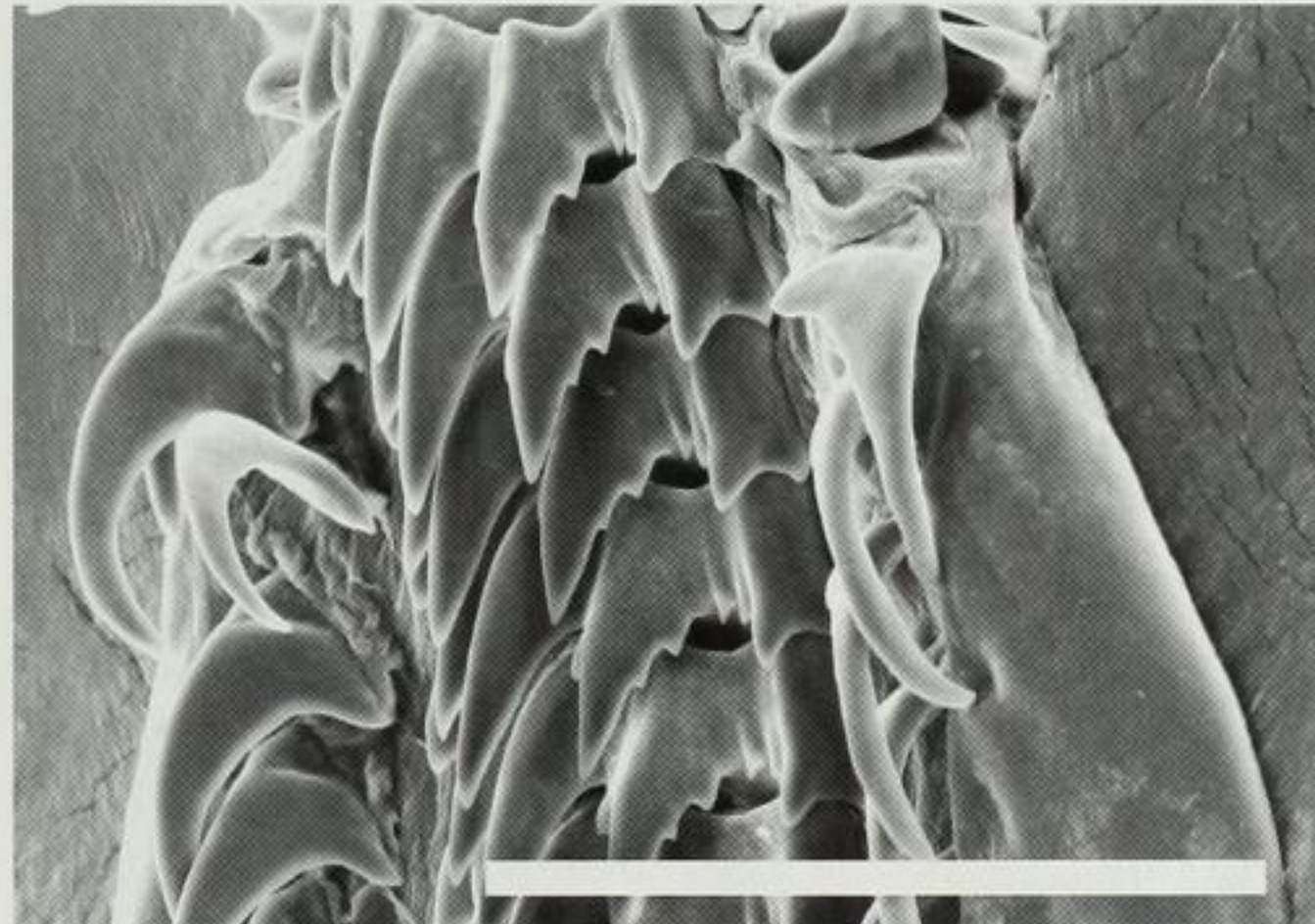
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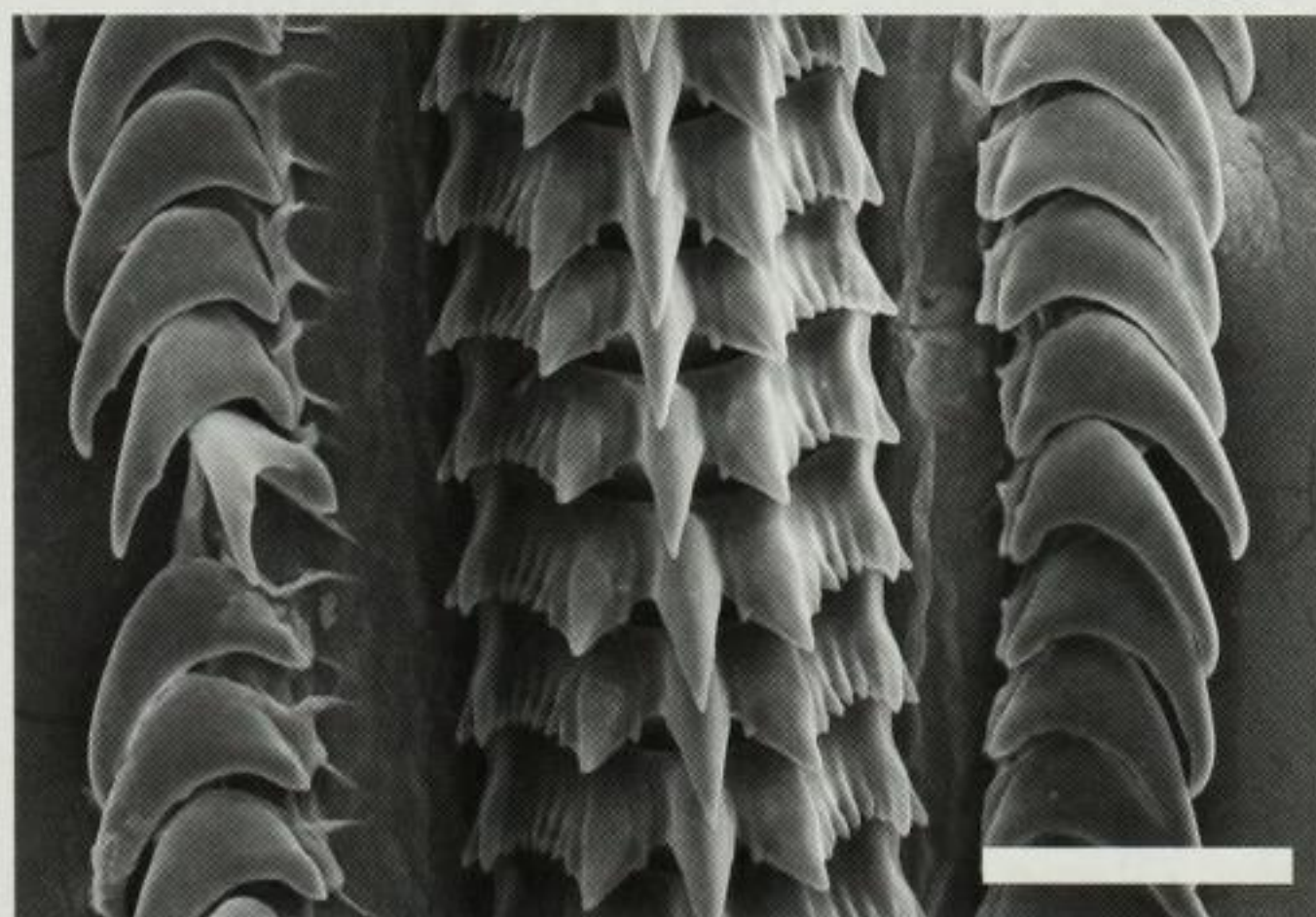
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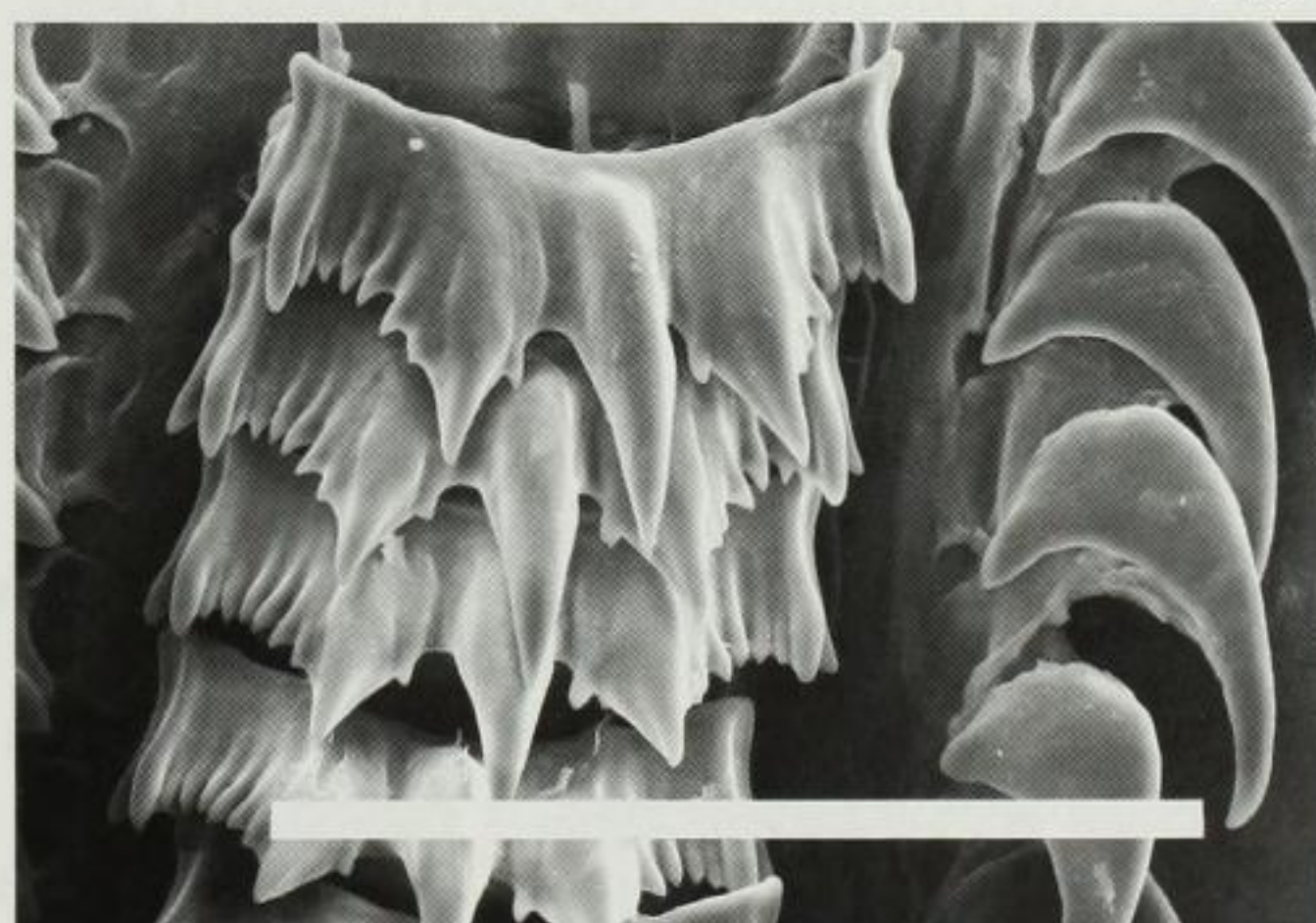
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The radula of *Zacatrophon*, *Austrotrophon* and *Forreria* (Figs 21-32) is closely related to *Ocenebrinae*, having the rachidian tooth with a projecting central cusp, a long lateral cusp with inner and outer lateral denticles on base, several marginal cusps and an obvious marginal cusp, as seen in *Ocenebra* Gray, 1847 (Figs 33-34) and *Nucella* Röding, 1798 (Figs 35-36).

Due to close relationship of shell, operculum and radula characters in *Ocenebra*, *Nucella*, *Forreria*, *Zacatrophon* and *Austrotrophon* (except the presence of a labral tooth in *Forreria*), I will also follow Kool (1993) and McLean (1996) and group all these taxa as separate genera within *Ocenebrinae*.

ACKNOWLEDGEMENTS

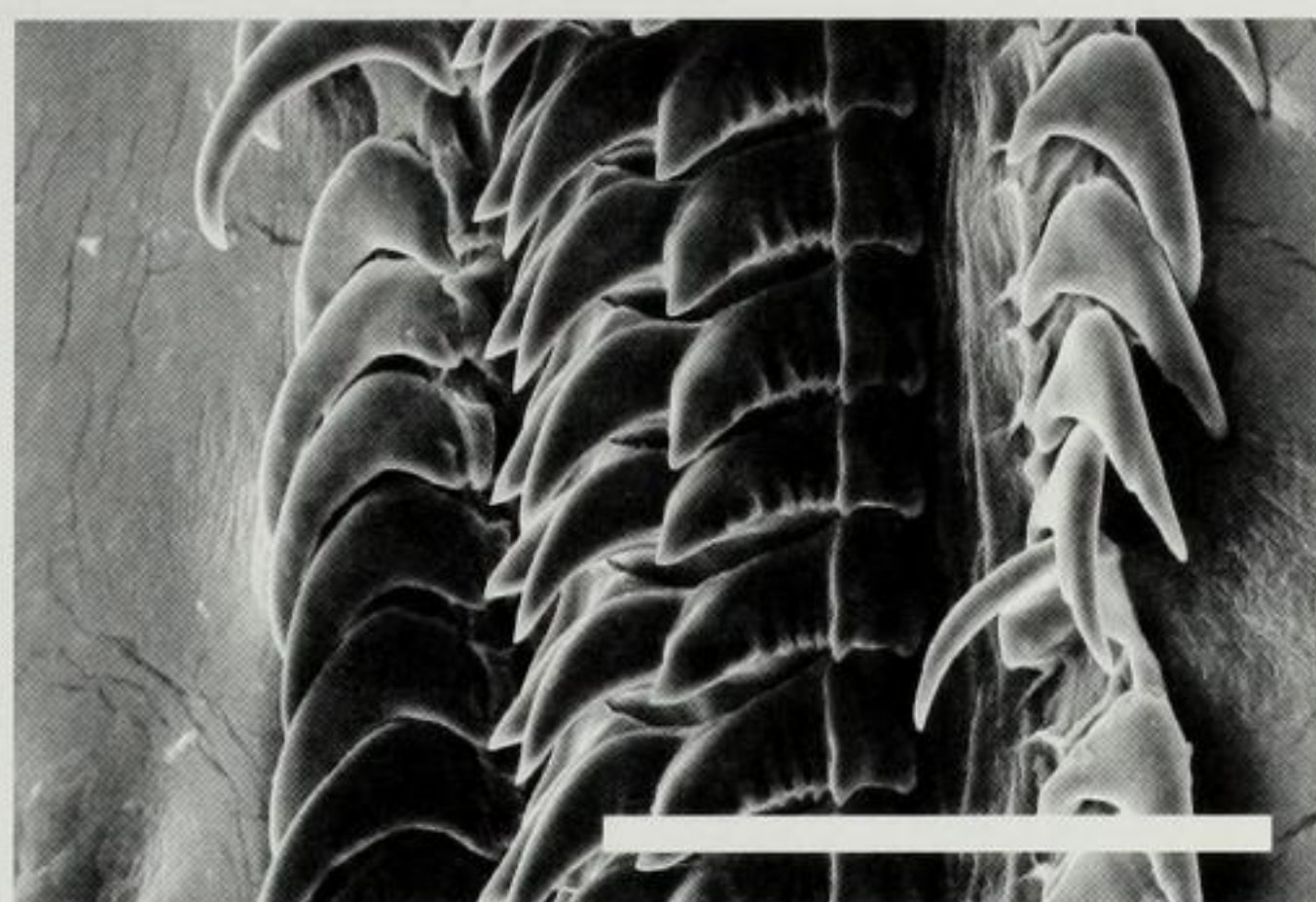
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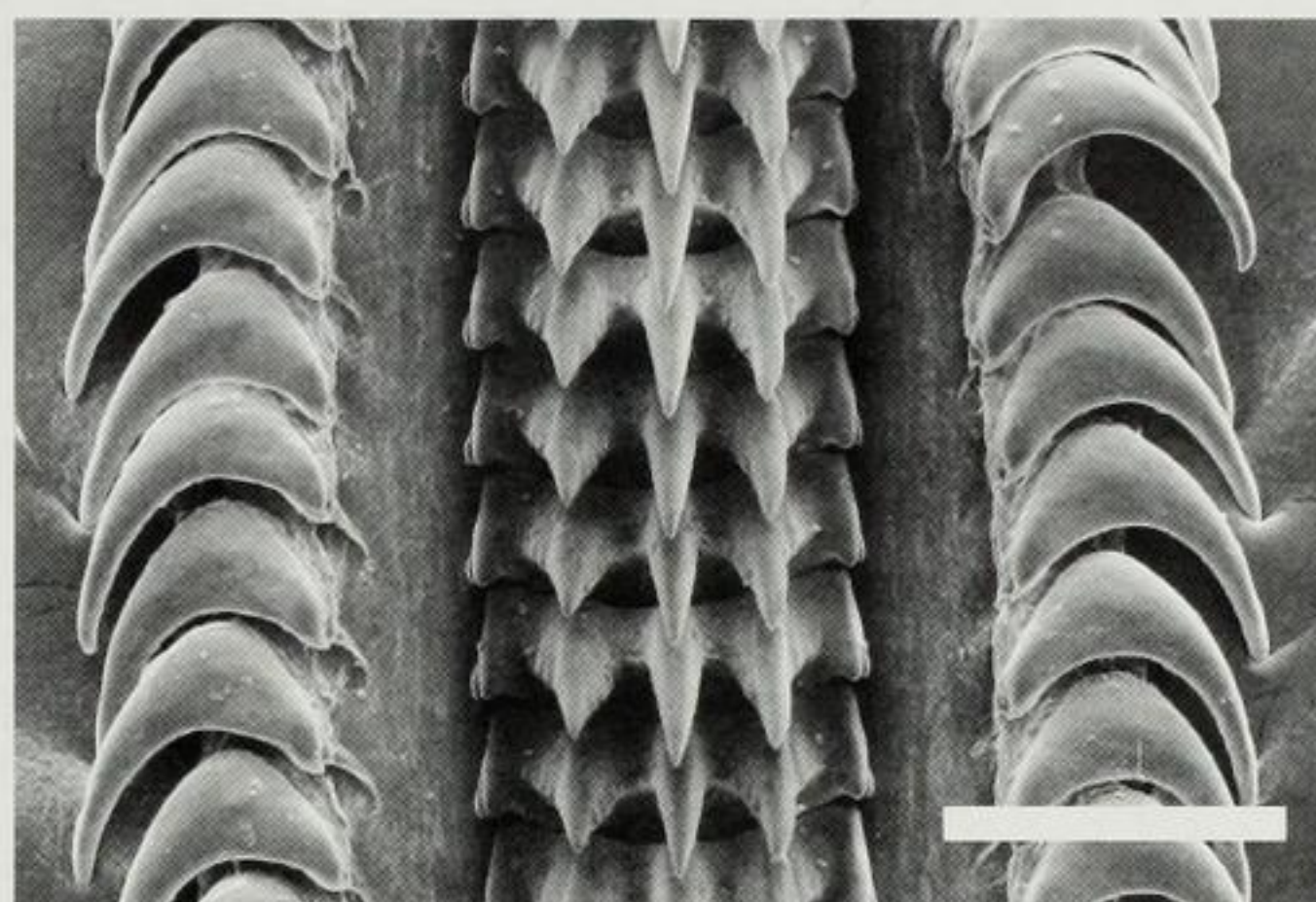
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Figures 29-36. SEM of radulae

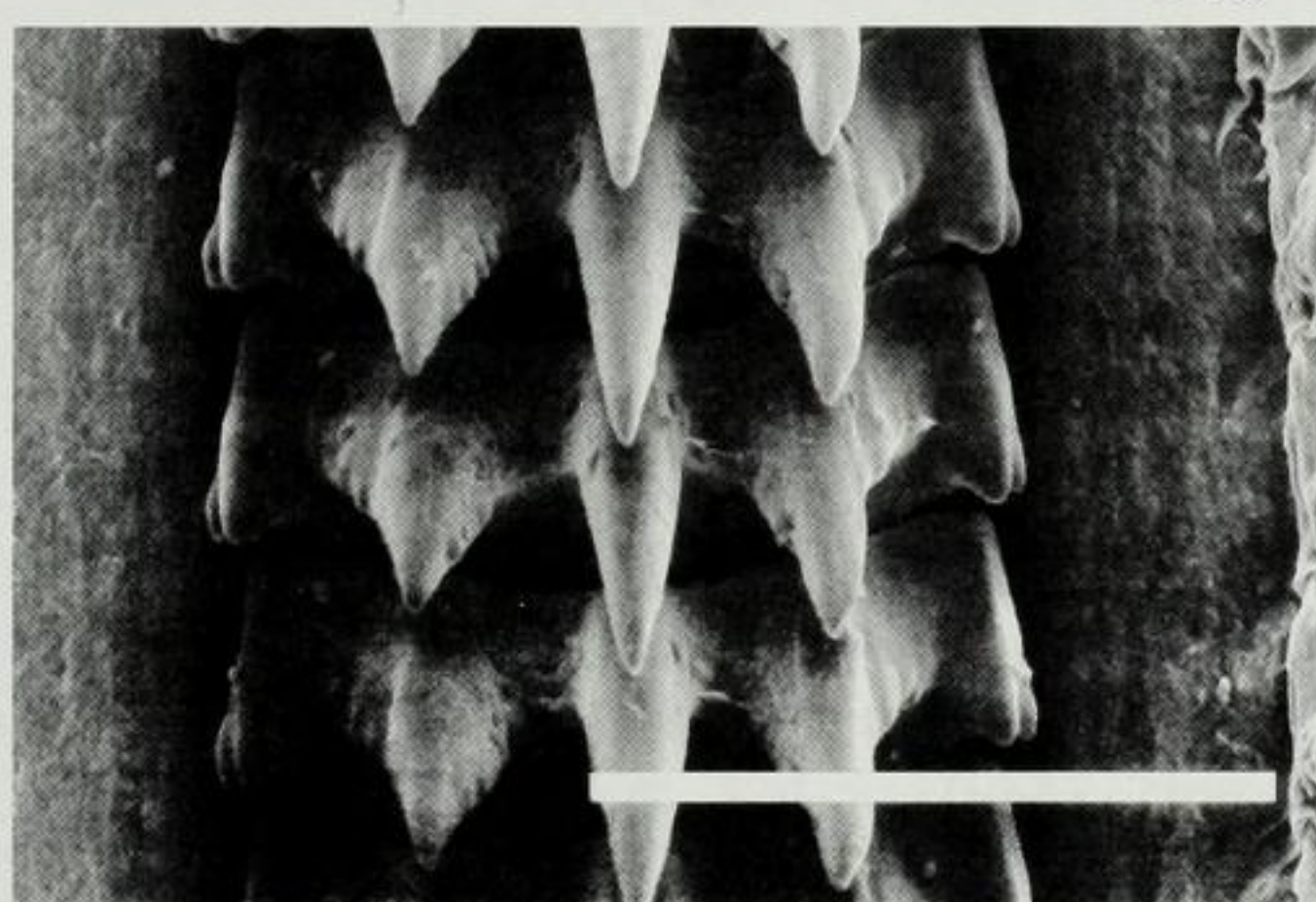
29. *Austrotrophon catalinensis* (Oldroyd, 1927), California, Los Angeles County, San Pedro Bay, 33°40'40" N, 118°17'32" W, SBMNH 100258 (scale bars: 200 µm).
- 30-32. *Forreria belcheri* (Hinds, 1844). California, Los Angeles County, 33°42'0" N, 118°16'0" W, SBMNH 99550 (scale bars: 200 µm).
- 33-34. *Ocenebra erinaceus* (Linnaeus, 1758), France, Brittany, Oleron (RH) (scale bars: 33: 10 µm; 34: 20 µm).
- 35-36. *Nucella heyseana* Dunker, 1882, Korea, Sokch'o (RH) (scale bars: 35: 100 µm; 36: 10 µm).



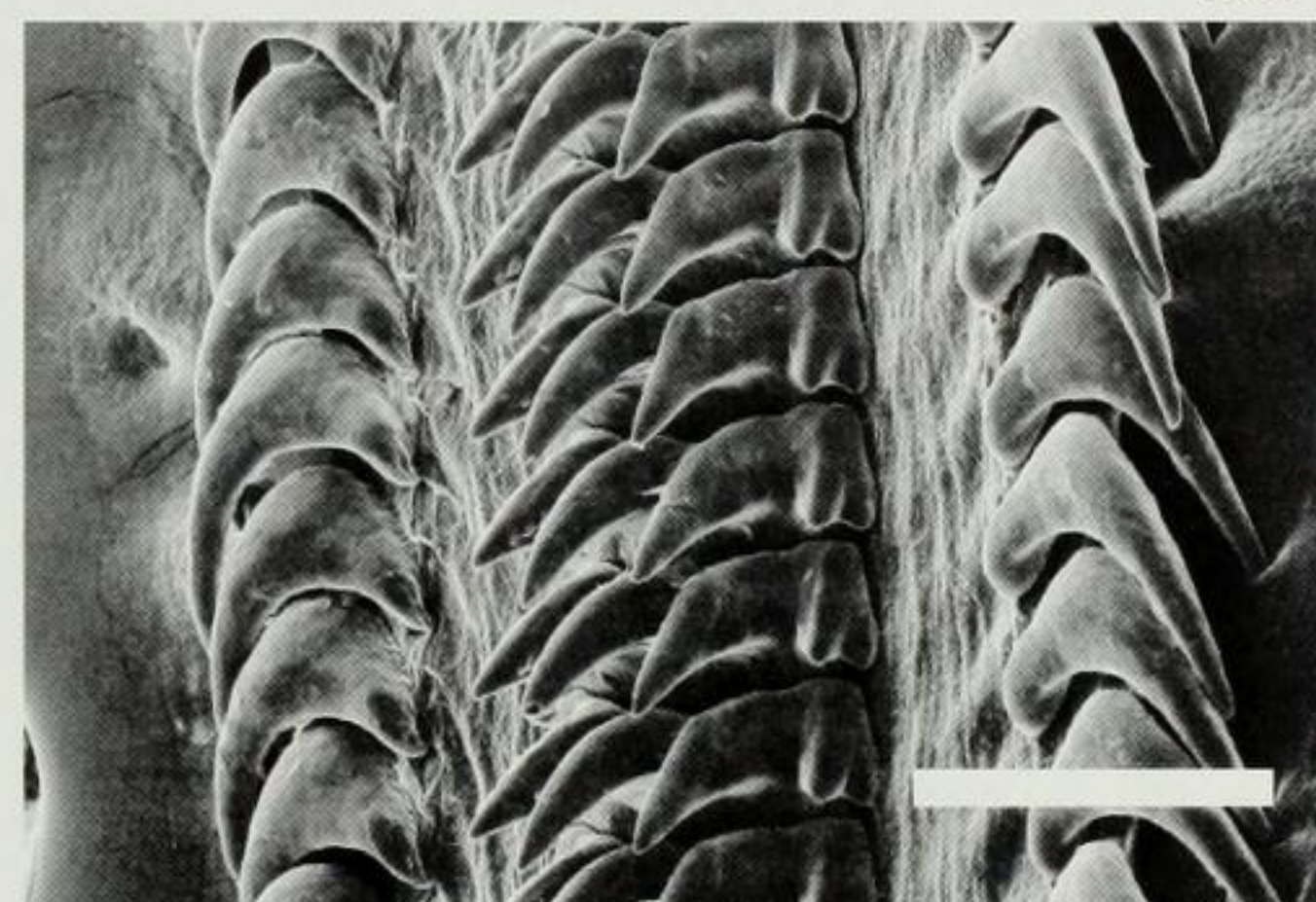
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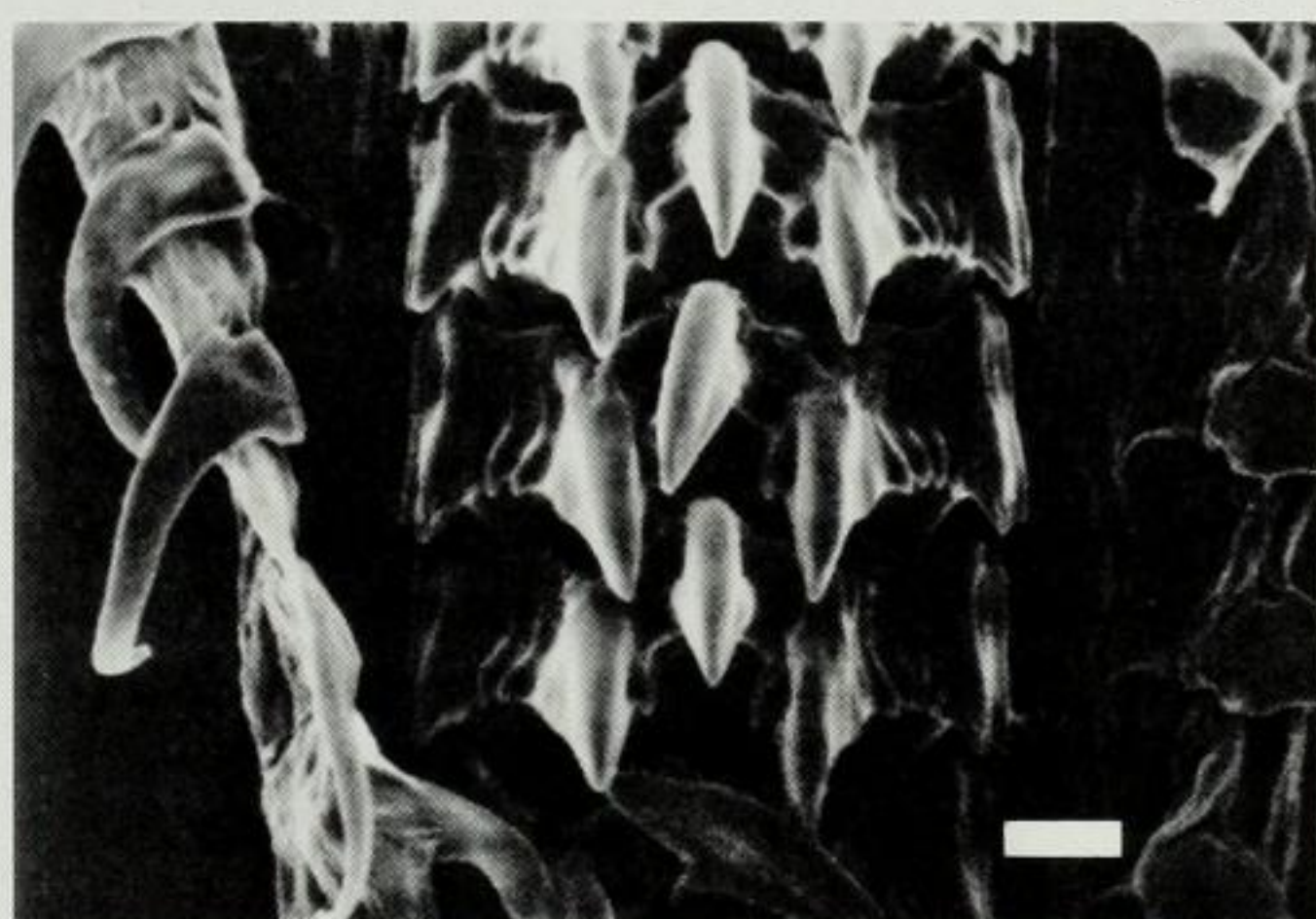
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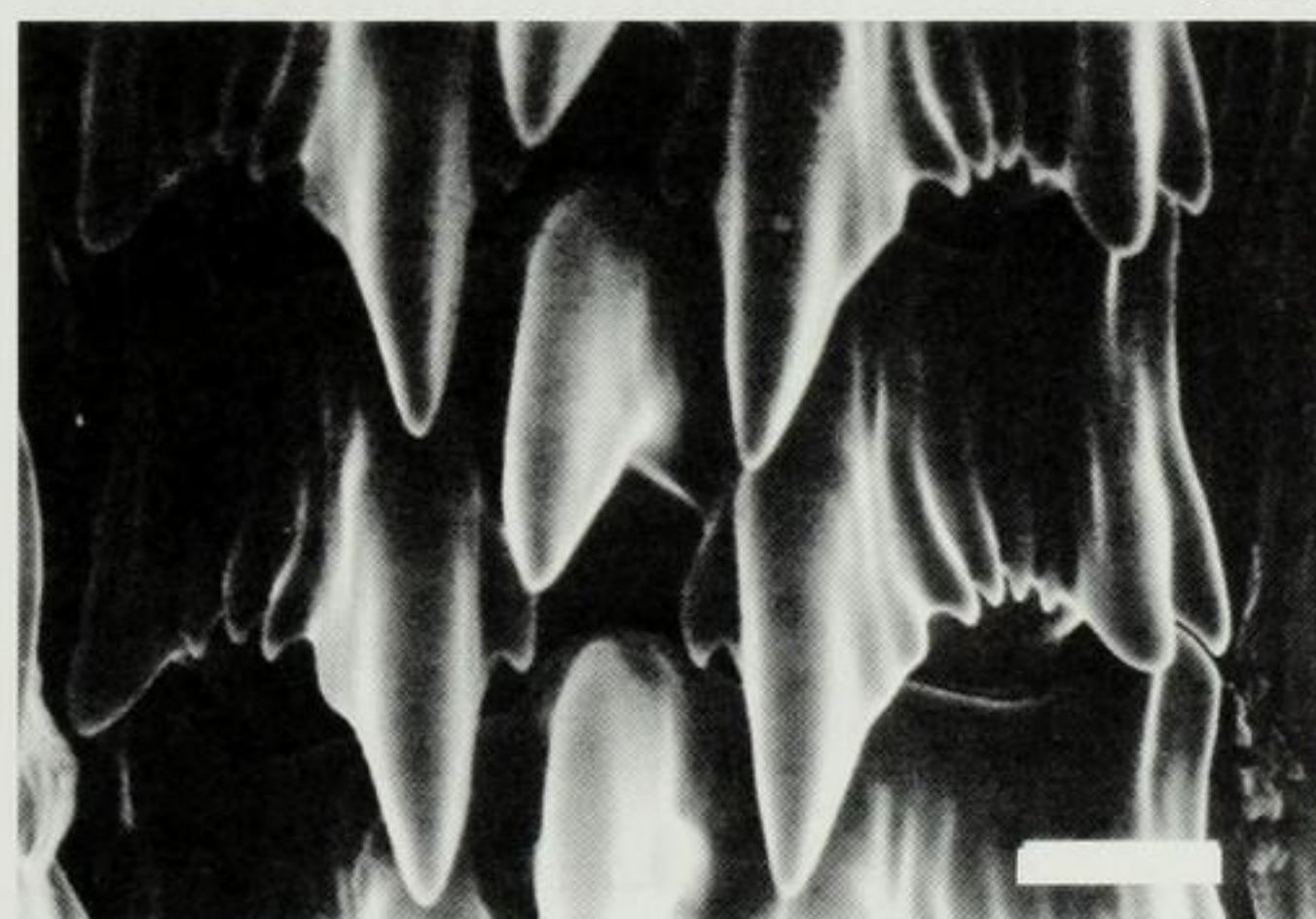
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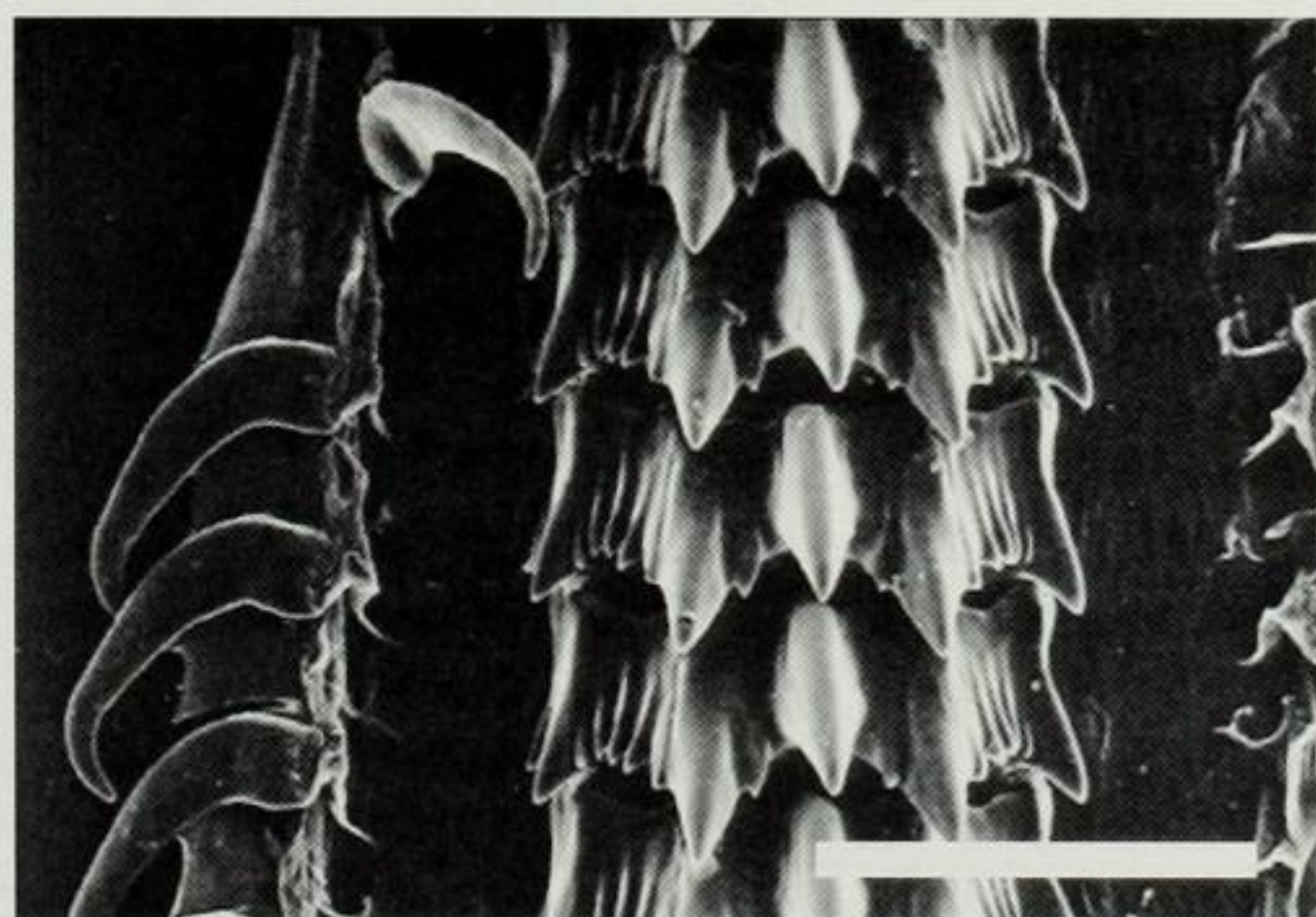
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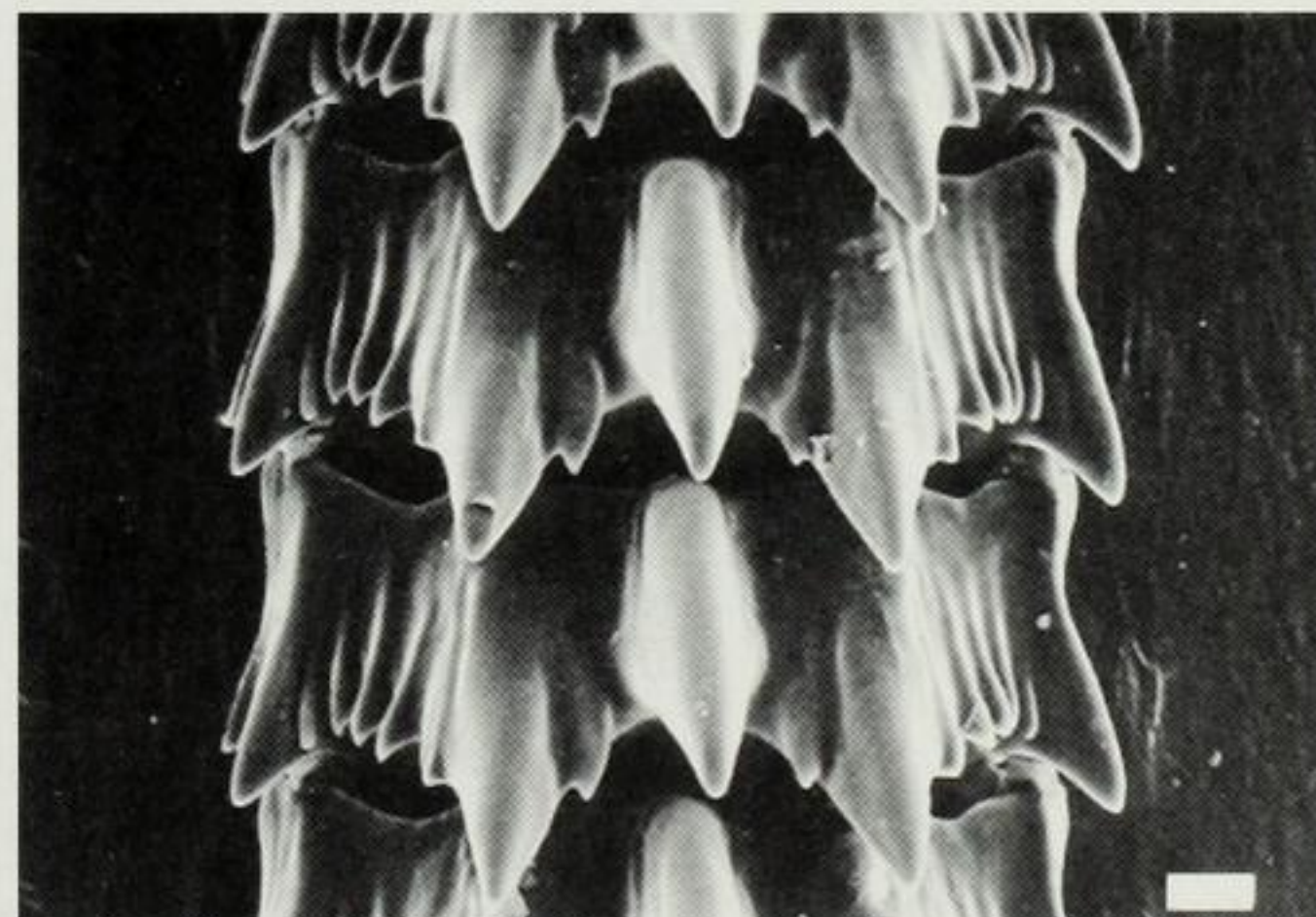
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